

Example of finding the hidden treasure essay



**ASSIGN
BUSTER**

Maths Assignment

According to the given problem, Ahmed's map states that the treasure is $2x+6$ steps away from the Castle Rock. At the same time, Vanessa's map states that the treasure is x steps north and then $2x+4$ steps east. Analyzing the two statements, we get that, there are two paths to reach the treasure from the Castle Rock. One is x steps to the north from the starting point and then $2x+4$ steps to the east and the other is $2x+6$ steps from the Castle Rock. Only solution to this problem is that, Castle Rock and treasure form two vertices of a right angled triangle, with the paths of x and $2x+4$ making 90 degrees and path of $2x+6$ being the hypotenuse. So this is a problem on Pythagorean theorem.

According to Pythagorean theorem,

$$x^2 + (2x + 4)^2 = (2x + 6)^2$$

Solving this equation, we get,

$$x^2 + (4x^2 + 16x + 16) = (4x^2 + 24x + 36) \text{ [as } (a+b)^2 = a^2 + 2ab + b^2]$$

$$5x^2 + 16x + 16 = 4x^2 + 24x + 36$$

$$(5x^2 - 4x^2) + (16x - 24x) + (16 - 36)$$

Hence, on solving, we end up getting a quadratic equation,

$$x^2 - 8x - 20 = 0$$

Solving the quadratic equation, we get ,

$$x^2 - 10x + 2x - 20 = 0$$

$$\text{ie. } x(x-10) + 2(x-10) = 0$$

$$\text{ie. } (x-10)(x+2) = 0$$

Solving according to zero factor property, we get a compound equation,

$$(x-10)= 0 \text{ or } (x+2)= 0$$

So value of $x= 10$ or $x=(-2)$

If $x= 10$,

They will have to walk 10 steps to the north, 24 steps to the eastor 26 steps directly.

But, if $x= (-2)$,

Then they will have to walk 2 steps in south direction and $2x-4$ ie. Zero steps in east , which contradicts the statement given in the problem.

So the best solution is $x= 10$ steps.

This solution can be reverse checked as well.

The numbers 10, 24 and 26 should satisfy Pythagorean theorem.

$$(10)^2 + (24)^2 = 100 + 576$$

$$= 676$$

$$=(26)^2$$

Hence , to find the treasure, they have to walk 10 steps north and 24 steps to the east or 26 steps directly from Castle Rock.